DOCUMENT RESUME

ED 452 240 TM 032 526

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TITLE Development of Competence in Dynamic Learning Environments. No. 79.
INSTITUTION Lund Univ. (Sweden). Cognitive Science Research.; Copenhagen Univ. (Denmark).
ISSN ISSN-0281-9864
PUB DATE 2001-00-00
NOTE 27p.; Sponsored by the Ruben Rausing Foundation for Enterprising and Innovation.
PUB TYPE Information Analyses (070) -- Opinion Papers (120)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Competence; *Evaluation Methods; *Instructional Materials; Measurement Techniques; Research Design; *Synthesis; *Text Structure
IDENTIFIERS *Perspective Text Analysis

ABSTRACT

Perspective Text Analysis is a way to measure competence by measuring the strategy of synthesizing, which intelligence tests or questionnaires cannot measure. This paper proposes the use of Perspective Text Analysis in the study of instructional materials. Perspective Text Analysis has been applied in various learning environments, and the results have shown the ways in which people adapt their thinking and action to situational constraints. Previous research has confirmed that the quality of instructional materials is crucial for the development of competence. Perspective Text Analysis can be used to analyze text materials for their conceptual relations so that they can govern learning situations. A theory of the construction of materials for the humanities and social sciences is also proposed as a new field of research. The starting point for studies in this field is a test that contains materials grouped according to the degree of difficulty in comprehension. The degrees of difficulty are related to three commonly accepted scientific models that build on the conceptual relations of behaviorism, cybernetics, and Gestalt psychology. Texts related to these models have been analyzed and their quality determined through Perspective Text Analysis. The materials can be compared with texts written by students as a way of defining the students' knowing or competence. The final part of this paper provides examples of prototypical studies in this area, showing some possible lines to follow when one wishes to introduce a humanistically based theory of materials into learning and judgment situations. (Contains 68 references.) (Author/SLD)

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ISSN 0281-9864

ED 452 240

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Inger Bierschenk

2001 **No. 79**

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Contents **Page**

Summary 3

1. Competence as Social Concern 4
2. Measuring Learning Processes 5
3. Studies from the Public and Private Sectors 8
   - *3.1 The Patient* 8
   - *3.2 The Financial Manager of a Community* 9
   - *3.3 The Regional Actors* 9
   - *3.4 The Co-operatives* 10
   - *3.5 The Ideologists* 10
   - *3.6 The Managing Directors* 11
   - *3.7 The Consumers* 11
   - *3.8 The Mechanics* 12
4. Preconditions for a New Research Program 13
   - *4.1 Demarcation and Specification* 14
   - *4.2 From Macro to Micro Level* 17
5. Toward a Theory of Materials Construction in the Humanities and Social Sciences 17
   - *5.1 The Knowing of a Behaviourist* 18
   - *5.2 The Hidden Competence* 19
   - *5.3 The Natural Scientist and the Question of Education* 19
   - *5.4 The Measurement of an Idea in Function* 20
6. References 21

Author's Note 25

Summary

In an information rich society like ours there is a demand for a steadily ongoing discussion and research of the way people in various functions develop and maintain their competence. Competence has become a word of fashion and although everybody thinks that they know what competence is, nobody can tell how it may be measured. The traditional definitions of the word rest on properties that are equal to knowledge and qualifications. Therefore, when it comes to a measuring procedure, intelligence tests or questionnaires will most often be used, which cannot get at the strategy of synthesising, the typical ability of a competent person. Some measuring instrument has not existed – until now. Its name is Perspective Text Analysis and is the main constituent of the research reviewed here and the program proposed.

Perspective Text Analysis has been applied in various learning environments and the results have shown the way in which persons in different functions adapt their thinking and action to the situational constraints. Such a constraint is reducing a person's quality of life considerably. Studies have made it evident, however, that a society may have a high quality of life, even though it may not seem so on the social surface. Those citizens, who conceive of the deeper dimensions of a society are competent and can provide their society with competence, transformed to quality of life. By means of theoretically founded models of social systems other studies have illustrated that (1) various models will be differently comprehended by different individuals and groups. They also show that (2) the comprehension of social properties is not the same when the model society is presented in the form of pure literature but (3) may be developed through training.

A conclusion of import to the continuous work is that it is the quality in the instructional materials that will be crucial for competence development. Against this background the purpose of the proposed program for competence development is to analyse text materials as to their conceptual relations, so that they can be governing in learning situations. A hypothesis is that the quality of a learning environment is independent of external factors. It is the materials that constitute that environment. A theory of the construction of materials for the humanities and social sciences is proposed as a new field of research.

The starting-point for studies in the new scientific field is a test material, which contains texts that are grouped according to degree of difficulty in comprehension (level). The degrees are connected to three commonly accepted scientific models, which build on the conceptual relations of the Behaviourism, the Cybernetics, and the Gestalt psychology respectively. Texts related to the models have been analysed in depth and specified as to quality. The materials thus fixed was then compared to texts written by students, with the purpose to define the student's knowing or competence, since there is a theoretical ground for it. By means of the theory of materials construction the effects of a learning process can be made explicit, that is what somebody knows. The final part of this article gives some examples of prototypical studies, of which the results will be concluded. They show some possible lines to follow when one wishes to introduce a humanistically based theory of materials into various learning and judgement situations.

1. Competence as Social Concern

In public discussions, 'competence' and 'competence development' cannot be avoided today. The educational sector has for a long time focussed upon both concepts and they form the basis for reformation at several levels. The industry is another area within which matters of competence have become important for survival. One reason is of course the rapid development of the IT sector and the European and global integration connected with it. However, among the companies there are different views on what competence is and the way it should be taken into consideration. The problem becomes acute when it comes to recruiting leaders. Nowadays it is not longer self-evident that graduates in economics, technologists, and administrators are the most fitted leaders of a company. Similarly it has become obvious that many of the most common works require another competence today than what was the case only a decade ago. A novel element in work life is further a high degree of participating and self-management, which calls for both knowledge and integrity, not to speak of the ability to overview and foresight. The employers are responsible that the workers and other personnel are carrying out tasks that correspond to their ability and that they can develop in their job. *Humans as resource* is more and more stressed (Forskningsrådene, 1997) and to be able to use this resource fully every human's ability to competent actions needs to be examined and maintained.

A matter of import is that the sharing of work between the genders can be developed in co-operation with the rest of the society. As it is now, we know that women have a double workload to a far higher extent than men have, which is very much depending on the fact that the typical female professions have inflexible working-hours. To support flexibility here would set female resources free, which would counterbalance the gender specific work market. Other groups are also focussed upon, as for example workers over 55 years of age. The discussion concerns whether seniors can contribute enough or not to the development of a work place. Luckily enough, society has begun to appreciate age as a potential and to take an interest in which kind of competence the seniors have and how it may be made useful in the work life. Researchers are telling us that competence develops with the synthesising ability, and thus it is not enough developed in the younger generation.

The introduction of information technology into various areas is the reason for thinking new within several sectors. Within health care, organisational changes have taken place through the introduction of computers for booking, payment, and registration of patients. The more IT training and experience the health service personnel get, the greater the distance to the patients. This could at least be the formulation of a research question. The acquisition of novel things within health care and service has its special conditions, since the processes are going on in collaboration with those who will profit from the service. The internationalisation of the service sector is a similar area, in which the concept of competence has been given a special weight. Which human resources are the desired ones are defined from out of which technical innovations are made and the service function concerned.

Within the industrial sector there is also work going on for reforming the production in a direction, which will be fruitful for the people who are producing. A question that the management must be able to answer is whether the power of competition of the company and its human power are working in phase or not. One area of development is the design of production systems, which support the human resources and not the technological. A well functioning industrial company today should further be aware of the social situation, although many of them are not. It puts a stress on both productivity and wellbeing, if re-organisations are made without the participation of all the employees concerned. It may seem as these times of authoritative management have gone but a manifold of stress-related diseases that we are facing today are to a high degree a result of insensitive, that is incompetent management.

However, there are employers, both private and public, who take the matters of democracy seriously. For example, schools are places where it will have great consequences for the students, if the teachers have no possibility to have an influence on their work situation. To develop the teachers' qualifications and competence without knowledge of their wishes is an all too common strategy, though. For the same reason as the students can influence their educational situation and ways of working, of course also their teachers should be given this possibility. The teaching profession is one of the most intensive, in a developmental perspective, but it faces today a decrease in participation and understanding from the part of the employers. When the focus is on changes in school, it is always re-organisation that counts. Younger teachers, who do not have the overview of the older colleagues, can not stand the social pressure and get sick or leave school as working place. Thus there is much to develop in this sector.

The consequences of the development of human resources may have an effect on the way people conceive of their spare time. Welfare, democracy and the possibility to influence the job may also have positive effects on the way people conceive of other qualities in life than the job. To care about one's spare time is important for one's general wellbeing, for sure. That such a quality of life could be connected with competence will probably seem new to most people. But to develop people's feeling for the relationship between work time and spare time will help them to take care about their working free hours in a better way to counterbalance the increasing stress on the job. In this way the chance to a de-stressed spare time will increase in pace with the development of the single individual's possibility to use his resources efficiently

Within all the above mentioned areas of society, "thinking human" is in focus but no research effort so far has been able to point at a way of measuring it or developing it.

2. Measuring Learning Processes

Typical of all modern societies are developmental trends, which are rapidly changing. A consequence of this dynamics of change is that the pressure to create effective environments for learning increases on both public educational systems and the production systems of the industry. However, what an effective learning environment within a sector of the school system, the university, or the industry means is hardly well defined. In what way the different sectors can create effectivity in preparing people for a professional/work life and the way they can train and retrain the already professionally busy depends entirely on what society can offer in the form of incentives.

From time immemorial, the design of learning environments has been basically the same as now and instruction has been carried on according to the didactical triangle, which builds on the presence of a teacher, a student, and a subject. Means for rising knowledge within this generic (teacher–student–subject) relation has with shifting disciplines and shifting times been concentrated on the development of methods, which would increase the effectiveness of some of the components. From the middle of the 20th century, methods for measuring teaching effectiveness have been developed, which are based on mathematical-statistical models adapted to study especially the quantitative aspects of the system. Education research has thus tried to establish principles for empirical analysis and the construction of mathematical models for a study of the effects of education on learning as a process that generates competence.

The ability to acquire skills and to develop competence is the main survival function making it possible for living organisms to deliberate themselves from the constraining mechanisms that may be built into a system or to overcome marginalisation processes at the working place. The importance of learning both for the survival of the single individual and of

society will not be questioned by anyone and many people have contributed to the issue with trying to find out its characteristic properties and ways of functioning. A manifold of definitions, theoretical approaches, and methods have been proposed, to begin with in psychology and during the last decades in artificial intelligence and neurology. But so far nobody has been able to give a satisfactory explanation of a learning process. It is possibly due to the fact that any appropriate measuring instrument has not been developed.

Many studies of learning are based on the classical procedures in research methodology, which were originally created by R. A. Fisher. More precisely this means that all participating subjects in an experiment are treated as equal as possible. Individual differences, if any, are regarded as source of error in the attempt to generate the well-known learning curves. As a consequence, education research has never been able to mediate anything of import to the single teacher's professional exercise. Reliable information is usually missing, which could be used for answering questions about the way ordinary people are mastering a learning process or the way learning generally comes about. Thus the public is now and then provided with summed-up statistics of education and measurements of preferences for one and the other of common opinions of how learning might occur. What seems to be quite clear to everybody is that education research has not been able to contribute with anything that may be a foundation for an elementary description of what constitutes a learning process. Further, this research has not been able to contribute with a reliable description of the interactions that create the quality of the didactic triangle.

The traditional instrument for measuring preferences is the questionnaire, which is based on the kind of interaction lying in a question and an answer. The linguistic formulations in such a questionnaire are founded on the fact that the one who asks is the one who knows and the one who answers is the one who makes himself subordinated (I. Bierschenk, 1989). The language carries the consciousness of this super and subordination, which unconsciously has an influence on a subject's way of conducting itself to the "questioner" of the form. Volvo mechanics' conduct to a so-called open question in a survey about the service materials of the company has been studied. It was obvious that Swedish and English mechanics are subordinating themselves to the questioner/company, whereas German, Italian, and American mechanics are autonomous in their responding behaviour (I. Bierschenk, 1987b). (More about this study in section 3.7.) This means that questionnaires of all kinds will probably not get at the respondent's attitudes for the reason that the answer is more or less bound to the question, which not all respondents being exposed to it are able to disregard. When the same model is used for an examination of learning or competence, it should not be surprising that it is the well-adapted students who will do best. But the really competent ones may slip out of the net.

Perspective Text Analysis is a method developed for the measurement of competence development, that is, learning. It has been in progress for twenty five years by now and is the most objective method that exists, in a natural science sense of the word (e. g. Bierschenk & Bierschenk, 1993; Bierschenk, Bierschenk & Helmersson, 1996; B. Bierschenk, 1991, 1997; I. Bierschenk, 1999a). With natural science is meant a certain conduct. The method is radically different from other language and text analysis methods in that it does not build on fragmentation but on the analysis of wholes, although without interpreting anything. It makes a synthesis of the human perspective, the way it emerges at the moment when a text is produced and at the same time, it crystallises specificity. In that by this method it is possible to say something about the general in the specific, the usual statistically based methodological arsenal becomes superfluous.

A first hint of what is meant by perspective as basis for the measurement of learning or competence is to be found in Bierschenk & Bierschenk (1993). The article reports on the testing of the theoretical outline of an ecological theory of perception reflected in language. It presents a study in which it turns out that the attitudes, and personal interests in life, helps to

"position" the person in front of a situation. Thus when the person looks at a situation in his environment and reports on it verbally, he uses language cues, which structures the environment differently depending on whether his attitudes are formed by aesthetic-moral, social, caring, practical, or physical-technical interests. The result is not in itself very surprising or even noteworthy, were it not for the method used. This study may be regarded as prospective, because before one can measure some learning or competence one has to take into account the pre-stage of 'inter esse'.

Whether girls show a feeling for technology has been an urgent theme in school for a long time. In the beginning of the 90's, a study in connection with lecturing in French in a technical gymnasium was carried out concerning the understanding of an apparatus for measuring the physical phenomenon of depth perception. As material for the study the pictures reproduced by the experimenters (Gibson & Walk, 1960, p. 65) were used. Four times during a school year, the students were given the task to describe their understanding of this technical device in the form of a narrative. Two female twins were then selected for the study. The question concerned the way in which twins, who are supposed to have identical biological preconditions, develop in a learning situation. (A description of design and procedure is given in B. Bierschenk, 1995b). The texts were analysed by means of Perspective Text Analysis, which is capable of getting at the underlying structure.

The two twin girls produced a fairly similar text, seen to the kinetic level, which is the one that a teacher can judge. Their achievement as a whole was similar, as judged from the grading. However, with the new method another relationship could be shown: At the kinematic level the twins were different. One perceived the analytical properties in the design and use of the technical apparatus whereas the other had a social perspective in her text and perceived the consequences of the use of this apparatus. With this knowledge it would have been interesting to know which career the girls choose when they quit school.

A study of another female pair has been reported by Elstrup Rasmussen (1997a). The educational situation was in this case psychology at Copenhagen University, where a BA-level examination paper was to be written. The students had the opportunity to select their co-writer, which should guarantee the best possible collaboration. The research question concerned the way collaborative work develops in this environment, which the students were to describe during the process, both the expected collaboration and the real. Perspective Text Analysis was the main method also in this study and the same kind of result emerged at the psychological level as at the biological. In this learning process it was evident that one partner develops a leadership, since she is competence oriented, whereas the other is more socially sensitive and develops toward administration of the task.

A recent study from another teaching context in Denmark has been reported in Bang & Elstrup Rasmussen (2000). Two female students in physics participated in a process where the dialogue was to be governing for their problem solving strategy. In this case, the experimenter formed the pairs. The learning situation concerned the concept of 'resistance'. The dialogue was analysed by means of Perspective Text Analysis. The analysis showed that one of the students was knowledge oriented and eager to steer the process forward, while the other was concentrated on distracting and stressed the social aspects of the communication.

What makes these three studies interesting is that they show that 'social competence' is a surface aspect of a communicative situation and has no value when it comes to acquisition and maintenance of knowledge. They further show that with a functional method we could get hold of the way different persons relate to learning. Then it would also be possible to arrange education with the purpose to put the responsibility of the learning on the student himself and not on the teacher, just as the modern trend goes (compare the discussion about evaluation in I. Bierschenk, 1999b). A study in the direction of modelling the relationship between

qualifications and competence is going on (Elstrup Rasmussen & Jensen, 2000) in which one aim is to make students aware of their strategies in a learning task.

Perspective Text Analysis is productive, that is, it is always posing novel problems and creates new theory. This special aspect of the method is fundamental to the research program put forward here. To begin with an overview will be given over some studies from the world of both the public and the private sectors, where the method has been used for synthesising the conceptualisations of individuals.

3. Studies from the Public and Private Sectors

A fundamental condition of the studies presented in the following is an extensive course activity, primarily on the doctoral level in business administration at the universities of Lund and Umeå, where Bernhard Bierschenk, Helge Helmersson and myself have functioned as course managers. One of the doctoral courses was carried out at the Institute of Science and Technology at Lund University (see section 4.1). The doctoral students and other participants have contributed with problem areas and texts, which were analysed in the courses. Some of the analyses have been presented at Scandinavian conferences, partly in business administration in Bergen (Bierschenk & Bierschenk, 1986b), partly in economic psychology in Aarhus (B. Bierschenk, 1987a). They have also been presented in educational contexts, such as a conference in Graz, about educational policy in the new millennium (B. Bierschenk, 1990b). Two doctoral students in business administration are users of the method in their dissertation work. A couple of studies are part of a larger project, others have been carried out in the form of a contract.

A main assumption for the study of the development of competence is that two factors can be separated, namely one concerning an individual's ability to compete for making a living, and one concerning the individual's success in relating to a given social context, according to B. Bierschenk (1993). If both competition and success are allowed to vary in the interplay between the individual and an environment, co-ordinating strategies will develop, which are favourable for competence development. Its opposite would be a completely rigid situation, which instead is causing the marginalisation of the individual. In this field of tension some results will be described. The words marked in italic are structural concepts, which emanate from topological representations.

3.1 The Patient

In the beginning of the 1980's, Kåre Berglund at Lund University Hospital conducted a research project in which rheumatic patients participated. As part of the design structured interviews were carried out by psychologists, who with a therapeutic method would find out what happened to the patients during and after the medical treatment. One patient was selected for the perspective text analysis and was studied at three interview occasions.

The information synthesis shows that at the first interview the patient thinks he is incapable of handling his environment because of the sickness. The rheumatism is limiting him, since he can only move at home or at the hospital. Therefore he must re-orient. However, he tries to have *trust* and *cautious optimism* to be able to survive in his new state. The second time the analysis shows that the patient has adapted to the *action constraint*. He feels less vulnerable and can see possible ways of *mastering* the state of the sickness so that *rehabilitation* may come about. What is evident in the patient's cognitive structure is the insight that he must *contextualise* himself to master the competence reduction of being a rheumatic. At the third occasion, the effects of the rehabilitation program are evident. The patient clearly shows how he has decided that the program shall be successful for him. He is

now *accepting* the routines of the treatment and everything that belongs to the changes in life conditions. His text the third time has a deeper and broader structure. The concept of *consensus* is deepest embedded and shows that some kind of balance between himself and his environment has been reached. In the perspective of the patient it is now *probable* that he will adapt, so as to be in command of himself.

In another clinical context, Magnus Larsson, a doctoral student in psychology, studied the way parents, especially mothers, have reacted to the birth of an impaired child. His main result is that mothers follow either an emotional or a methodological line of thinking as they relate their conceptualisations of the traumatic situation (Larsson, 1994).

3.2 The Financial Manager of a Community

Two doctoral students in business administration at Lund University, Göran Alsén and Anders Nilsson, had carried out an interview with a financial manager of a community in the north of Sweden at the beginning of the 1980's concerning his opinion of leadership and matters of policy. A section of this interview, in which the manager could talk freely, was analysed within the frame of a faculty course in Perspective Text Analysis the academic year 1984/85. This text has been the subject of several studies, especially because it is authentic and thus not edited. Its first sentence is worded:

> "Look how the attitude is today, and it is not only among the community employees, most people think that I have my salary, why should I then help the community to think of how to save money, I don't give a damn."

The two students had a feeling that something important was expressed at this place in the interview. Other course participants thought the section reminded of "sauna talk". But some general thinking does not help, Perspective Text Analysis could reveal what was hidden under the surface. Bierschenk & Bierschenk (1986a) account for the conceptual structure underlying the talking.

It became obvious that the mental conduct of the financial manager oscillates between *conformity*- and *locking* aspects on the one hand and *enterprising spirit* and *innovation* on the other. He feels split between what the community responsibility makes of him and what he would like to be. In his perspective a *functional fixation* emerges, which he manages to *structure*, however, so that the result is *liberation*. When this analysis result was presented to the two doctoral students in the course, they told that this financial manager in fact had taken a step toward liberation, namely as a business owner. Perspective Text Analysis could hardly get a better external validation.

3.3 The Regional Actors

The doctoral students in business administration at Umeå University, Margareta Paulsson and Åke Gabrielsson, have studied actors' conceptions and strategies for local development (Gabrielsson & Paulsson, 1989; 1996). By applying the Perspective Text Analysis on deep interviews of two dominating actors in two communities, Gabrielsson and Paulsson could show that two actors with similar background had different conceptual world. One is governed by concepts like *acting in the present*, *instrumental rationality*, *enterprising* and *market adaptation*. The other is governed by almost the opposite concepts, that is, *history and future*, *value rationality*, *ecological actions* and *human – nature adaptation*.

The authors note that the two actors have different opinions about which means are to be used, that is, which problem solving strategies exist and which role society/community will have. Thus there is a clear connection between the conceptual world of the actors and the strategies they propose for the development of their communities, which could be fateful if

the two communities in practice did not use the same method. The authors received the ANBAR-prize "Citation of Excellence" in 1996, "using Bierschenk's novel technique of perspective text analysis".

3.4 The Co-operatives

In the above mentioned faculty course, Gösta Wijk and Magnus Lagnevik from business administration in Lund participated. They contributed with an empirical material from their studies on consumer co-operatives in Sweden. The material was taken from Statens offentliga utredningar (1979, 1981). The text section analysed (by B. Bierschenk, 1993) was judged to be the most significant policy statement within the co-operation.

The policy means in short that the effectiveness of the co-operation lies in its ability to control the associations. The organisation and associations bind one another so that two growing *power concentrations* are formed. Thus the means that the co-operation has to its disposal are expressed in *organisational analysis* and *unifying* or *uniforming*. The proper basis for the policy is the purpose to draw the borderline for the co-operation and influence it ideologically, a reason why the basis coincides with the means.

"Collective problem solving in co-operative companies" was the name of a project lead by Magnus Lagnevik and Helge Helmersson around 1986. As a part of the project, the text analysis method would be used (I. Bierschenk, 1987a). The study concerned Skånska Lantmännens Maskin AB (A co-operative for agricultural interests). 152 study circle leaders collected answers about how the company was conceived as a member organisation, the status of the solidarity among the members and how the trust to the company would increase.

The cognitive process, the way it is expressed in the conceptual worlds of the members, is dominated by two concepts, *collectivisation* and *bureaucratisation*, which are counteracting the idea of co-operation. The most desired means to be adapted are *co-operative strength* and *effectiveness*. The reason or ground of this conceptualisation is a *demand for ethics* and a *missing contextualisation*, in other words, the organisation seems to act as if any members did not exist but only customers. In sum, the co-operation studies have shown that co-operation is desired but is brought to nothing by the efforts of organising the proper idea. Maybe it is an expression of the scientific problem of being able to separate between competition and co-operation within a group (Johnson, et al., 1981).

3.5 The Ideologists

Issues of religion were still at the beginning of the 1990's something belonging to the domains of the public. Two sociologists of religion, Curt Dahlgren in Lund and Pétur Pétursson in Reykjavik, took part in the faculty course in Perspective Text Analysis. Dahlgren (1990) studied missionaries' reasoning behind their preference of attending missionary schools. The common opinion is, according to Dahlgren, that reading stories in the missionary papers about the conversion of the heathens would be the reason why one tried to join the missionary corps, that is, one wants to go out and do good things. The analysis of a curriculum from an applicant gives on the surface the same information, but at a deep analysis it was evident that his personal salvation is in focus and the wish to deepen his *salvation experience* through increased *awareness*. Dahlgren draws the conclusion that in depth it is the *education* at the Evangeliska Fosterlandsstiftelsen (Evangelic Patriotic Foundation) missionary school that the curriculum writer is yearning for.

Pétursson's research area was the one that he coined, namely "civil religion". By this name he means the collaboration, taking place since the 1960's between ecclesiastical and profane authorities in Sweden. Pétursson (1991) analysed speeches given by Olof Palme

1965, 1968 and 1983, and the archbishops of the same times, namely Ruben Josefson 1968 and Olof Sundby 1983.

The summary of the analysis shows that Palme's speech of 1965 is characterised by *human rights*, in 1968 it is *international solidarity* and in 1983 the non-utopian *global planning*. Archbishop Josefson's sermon in 1968 comprises the corresponding concepts at the religious level, as for example *solidarity with the feeble* and a general appeal to reconsideration. After a deep analysis of the speeches, only the year of 1968 seems to have been a time where there was a bridge of civil religion between church and politics. Sundby's talk from 1983 is traditional and non-problematic, as for example the meaning of *God's kingdom on earth*. Pétursson's conclusion (p. 25) is that the close associations that could be noted by the end of the 1960's were not followed up on the ideological level. Palme and his archbishop went apart.

3.6 The Managing Directors

In 1991 Agneta Karlsson completed her doctoral thesis "Om strategi och legitimitet" (On strategy and legitimisation) (Karlsson, 1991). Among other things she studied annual reports from an energy company. Already in 1986 we got in contact and the method was tested on a portion of her material. The research question concerned whether strategies and visions for the future could be read out from annual reports. She was interested in the analysis of especially three reports, the ones from 1979, 1981 and 1983. However, in her thesis she did not use the results, so B. Bierschenk (1993) reported them.

The quality in the conceptualisation of the manager of 1979 emerges through a derived *consensus*. He wants to have the possibility to make decisions according to the chosen strategy. This implies that he has a functioning *administration* behind him, so therefore the *probability* that he will be successful is high. As means for his strategic thinking *calculation* is evident and his goal is *binding*. The latter concept should be understood against a juridical background. The structure from 1979 forms the basis of a policy, which is founded on the idea that both individuals and companies respond with "perfect foresight" in front of economic incentives and warnings (Holler, 1982 p. 51). But it is not effective when it comes to adaptation to consumer factors. Therefore the company decided to re-orient and shifted the manager in favour of a person with another vision.

The new manager's first annual report 1981 showed that a market adaptation had occurred. His report is characterised by *competence*, *harmonising*, *sensitivity* and *consciousness*. Thus he bridges the technical-economic aspects because of their focus on capital and investment. Instead the policy for industry production is given a morality component (compare Sperry's expression "morality is given priority over science", 1983). The goal is to secure *synergy* effects, which means a qualitative change of the properties standing for energy production. 1983 the managing director has some *projects* going on with autonomous units, which hopefully will contribute to a *functional synergy*. However, he had to retire in favour of economic reality.

3.7 The Consumers

In connection with courses in business administration on C-level, Helmersson (1997) has studied the consumer perspective in using Perspective Text Analysis on texts collected to compare preferences of the two Swedish organisations, "Konsum", which is a co-operative, and "ICA", which is private. The texts produced contained customers' motivations for their choice of daily store. The results show that the typical ICA customer acts stable; *economic rationality* and *economic man* are the most central concepts. The ICA customers further are

associated with need for quality, thus they never go to Konsum. The customers of the co-operation, on the contrary, seek new orientation because they feel constraint by the co-operative traditions of the organisation, because of its lack of quality. Thus *co-operation in change*, *loose frames*, *individual customer actions* were conceptual outcomes typical of these customers. Typically they were prepared to go to shop at ICA, if necessary.

In general, this result tells something about the image of the organisations and the direction in which they need to adapt to their customers. Trosslöv Aronsson (1997) means that idealised images "attract people and draw their attention, but they also may create dissatisfaction and unhappiness" (p. 1). By using a projective technique she generated four consumers' (females) texts in connection with viewing idealised images in the advertisements of a chocolate product. The consumers wrote a short story about how they think people would perceive the advertisement in which they were models. The results analysed by means of Perspective Text Analysis could show that either the image reflects an idealised icon (as represented by *divinity*, *sanctioned hedonism*, and *exhibitionism*), or is regarded as manipulative (*manipulation*) depending on the consumer's projection.

3.8 The Mechanics

In the middle of the 1980's Volvo had problems with the information structure in its service manuals. A feeling that the mechanics conceived of the information differently depending on the country in which they worked made the company seek assistance from researchers, among others two doctoral students. A questionnaire had been distributed to garages in several countries, for example Sweden, West Germany, England, Italy and the USA. The final question was of a so-called open type, which on behalf of Volvo was analysed by means of Perspective Text Analysis. The report (Bierschenk & Bierschenk, 1987) could show that Volvo should adapt its service information depending on the country to which it shall be directed:

Sweden. The conception of service information in Swedish mechanics shows that among them there is no interest in technical information whatsoever. *Lack of quality*, *simple-mindedness* and *unsophistication* are characterising their responses. The reason for this is the *working climate*.

England. The English mechanics are to a higher extent prepared to do a job. *Information quality* is a key word, supported by *service support* and that the *organisation* of the information is important. In the depth lies a demand for greater *coherence* between the support and the service user.

Germany. In Germany (West Germany, by the time of the study) it is self-evident that *high quality service* is a key word. The mechanics are anxious that they cannot *maintain knowledge*. For them a *measurement* of standard is the basis for the answers, which implies that the German mechanic wants to compare his skills with the new information in the service manuals to be as efficient as possible.

Italy. To the Italian mechanic *information structuring* is a reason for being able to make a good job. He is not sure that he is sufficiently able and very much wants to *acquire* the necessary knowledge, he wants to be *capable*. *Tutoring* is asked for in Italian garages.

USA. American Volvo mechanics means that the company does not *authorise* them sufficiently. They *master* the Volvo car and the service of it and are of the opinion that the company gives them *insufficient information* purposely. In the US, Volvo should re-organise its service information policy to *recognise the ability* of the single mechanic. Since the reason for the answer is that he expresses his unambiguous *comprehension*, he thinks that the company does not meet him with *worthiness*.

4. Preconditions for a New Research Program

There is a common conception that three distinct models can represent the qualities of a civilisation. The models were arrived at through an interdisciplinary conference on the building of modern society in Boulder, Colorado, in the beginning of the 1970's. Social and behaviour scientists, economists, and technologists conceived of these models as general. They were called Behaviour model, Growth (Process) model and Humanist (Structure) model respectively and were presented in an audio-visual material called "Projections for the future" (Biological Science Curriculum Study & Crystal Productions, 1976).

However, it would not be sufficient to rely upon some general conception of existing models if one aims at using a material for scientific studies. B. Bierschenk (1978) in the construction of a simulator for the examination of strategies of behaviour could show that that these models really exist and are significantly distinguishable from one another. Further, the models are far more psychologically significant than would be expected from the Boulder discussion of their social relevance. In using an early version of Perspective Text Analysis Bierschenk & Bierschenk (1986c) indicated that scenes representing an environmental structure of the three model types will elicit action strategies, which could be assigned to the three models. Thus an environment may be reflected theoretically in individual actions.

Since the end of the 1980's it has been an aim within the Cognitive Science Research Group in Lund to study quality of life and its dimensions, both in a psychological as in an economic and medical context. The analysis of a patient mentioned above shows that the concept of 'worthiness' is central, when an individual losses in *quality of life*, depending on constraints in contextual radius. These two concepts have been studied operationally.

B. Bierschenk (1987b, 1988) used the three model societies in a couple of initial studies of quality of life. By means of a discriminant analysis this study has made a difference between the three models and Sweden as the participants' familiar context, in such a way that the highest quality of life is assigned to the Growth model whereas Sweden is judged to have less life quality. Bierschenk, Helmersson & Lohmander (1987) studied in a follow-up the way students of economic subjects conceived of how the three models could maintain their worthiness and increase their quality of life respectively. The results this time showed that the Swedish model, which earlier was conceived of as a week maintainer of life quality, instead scores higher on worthiness.

A measuring instrument, which defines the perception of two ecological components, has been developed with multivariate statistics during a long period of time. One component specifies the development of worthiness ('Eigenvalue'), and one specifies the social visibility of some worthiness having been developed ('Visibility of social structure', later on termed 'texture') (B. Bierschenk, 1989 a, b). The reliabilities accounted for concerning both dimensions are very high (alpha $_{max}$ = 0 .97, 0 .87) in relation to what is normally reported in behavioural science.

This instrument, which is a paper and pencil test for the measurement of perceptual competence, could then be used to empirically define competence as a measure on civilisation (B. Bierschenk, 1992, 1995a) via the concept of consciousness. Thus competence is connected to quality of life. Without competence – no life quality. The instrument was possible to test in a study of Swedish and Danish gymnasium students' perceptual competence in conceiving the conditions of life in their society. The hypothesis was that "The development of Eigenvalue and its conservation by means of an appropriate 'Social Texture' requires an advanced civilisation" (B. Bierschenk, 1998, p. 18).

Swedes and Danes were different in perceiving properties of both structure and texture. The Danes think that the Growth model best conserves Eigenvalue and that this model and the familiar society are similar. The Swedes on the contrary do not think that their

own model is fostering Eigenvalue and that the positive properties are reflected in the Behaviour model. They could not differentiate between the surface (texture) dimensions of the models and the Swedish model.

In the study mentioned above, seven Danish gymnasium schools participated. In a special study, which was a comparison between two Swedish gymnasium classes, some Danish classes and a group of Danish university students, the Danish gymnasium students now came out as unable to differentiate the three models from each other (Bierschenk & Marker, 1998). The result is remarkable, since the society models function discriminatively otherwise. This at the same time means that the students of this gymnasium may be unable to comprehend the contextual preconditions in order to be able to adapt their action patterns to the society they live in. Yet this school is regarded one of the best in Copenhagen, as seen to how the students perform by means of ordinary grading measures.

The scale has been applied to Swedish gymnasium students (I. Bierschenk, 1998a), where they had to judge the certainty in their perception of the three models and Sweden before and after an instructional process. The first time, the Behaviour society was perceived as the only one with specified quality. The second time the Swedish society was perceived with highest certainty and at the same time that this society is Behaviouristic. Thus the students have learnt something about the society they live in through the instructional program. This means that quality of life, the way it is specified on and under the surface of society, is perceived differently depending on the competence of those who live there. Therefore, one has to assume that it will be possible to train for quality of life.

Finally a study will be mentioned, which was carried out in collaboration with the University of Singapore, which arranged the first international conference on "Quality of Life in Cities" in March 1998. To a group of students (99 participants) in architecture and building, supervised by Belinda Yuen, the three model societies were projected. The purpose was to find out whether young people in Singapore perceive their own civilisation as qualitatively high, especially against the background that the city and state of Singapore wants to be a "City of Excellence", according to the visiting cards of the representatives. In the competition – success field of tension earlier mentioned Singapore was compared with Denmark (Bierschenk & Yuen, 1998). The hypothesis was that Singapore, in being a strongly regulated society, should be judged to be weak with respect to the maintenance of Eigenvalue (here the competition dimension).

It turned out that the two countries did not differ, despite some principled organisational differences. The conclusion drawn by the authors is that the Singaporeans have a "perceptual competence" in conceiving the qualities of their society, irrespective of the prevailing restrictions. Their basic idea is that a "city of excellence", that is, "competence", is a goal that may only be obtained through the voting of persons for important appointments of the society. The students in Singapore are conscious of the importance of studying and that their personal development contributes to civilian excellence (B. Bierschenk, 1999).

4.1 Demarcation and Specification

It can be stated that the perception of a society - context, milieu - is dependent on the competence of the perceiver. A restricted context must not necessarily have any constraining influence on those who live and work there. The Singapore instance points to this clearly. The perceptual ability is the competence, which has great implications for the way a society educates and trains its citizens for the future. People, who are able to look through the regulations and for example perceive how a Humanist model is working structurally despite its surface properties of Behaviourism, have a potential and a flexibility, which should be taken advantage of. For society it must therefore be of utmost importance that we can find the

key to the ways in which the educational system might be a springboard to competence development.

The three basic paradigms, operationalised through the Behaviour, the Growth and the Humanist models, are used in the study of human behaviour from individual to civilisation. The first one, known to learning theorists, is the behaviourism or S-R theory. The second is, probably, known to technologists by the name of cybernetics or the process model, which is close to the functionalism. The third is the more humanistically defined structure model, also known as Gestalt theory.

Each one of the three videos shows a civilisation, which builds on the scopes and constraints of each model in getting human and societal functions to coexist. They concretise the model by telling a story of about ten minutes. The stories are in short the following:

Behaviour Model. A young man is found in a park and is rescued from under-nourishment. He is taken to hospital but suffers from amnesia. A story takes place in which society in the form of a physician and his assistant by behaviour modification try to adapt the young man to a collective. The loss of identity is central.

Growth Model. A young man lives in a technically advanced society and is on his way into a modern city centre. He faces the vulnerability in a number of dysfunctions, which symbolise the constraints that are prevailing when the wishes of people and the capacity of society are interacting. The need for re-creation of life quality is concretised.

Humanist Model. A young man arrives with a modern vehicle to an ecological forest plant. He gets a mentor, who is a scientist, and who will teach him to develop and get to know himself in collaboration with his environment. The entire developmental process is permeated with the feeling for worthiness.

The material has been produced for instructional purposes at the upper secondary, college and university levels; its authors are university professors in behavioural science, social science, economy and technology. However, it is not clear from the descriptions (Lee & Mayor, 1976) whether the thinking in models really is reflected in the product, so that it carries the theoretical dimensions implied by the different models, even though this was the aim of the constructors. The studies on life quality already referred to could verify that the societies have operationalised the three scientific paradigms (behaviourism, process, structure) (B. Bierschenk, 1987b, p. 5, Table 1). This assessment was made by trained experts' conception of theoretical concepts in function. The stories to a high extent take place through dialogues and whether these, that is the verbal text in the story, had the same theoretical foundation was the topic for Elstrup Rasmussen (1997b, 1998).

Elstrup Rasmussen carried out some field studies at a Danish industrial concern. In this connection the video material was to be used. He analysed the dialogues by means of Perspective Text Analysis and arrived at the conclusion that the structural concepts *defeatism*, *encapsulation*, *shaping* and *mob* could be read out from the dialogues, which corresponds perfectly with the behaviourism, according to Elstrup Rasmussen. In the model based on cybernetics some of the fundamental concepts of this theory emerged, namely *exploration*, *competence*, *aggressiveness* and *balancing*. The humanist society has got the structuralism in its roots, which was proved by *assisted maturity*, *aha-experience* and the *achievement* of the Gestalt.

This theoretical, well-constructed material had an important function in two studies within an educational context, which are of basic significance for continuous research in competence development.

An initial point of departure in higher education is a doctoral course (supervisor: Ingvar Persson) conducted at the Department of Industrial Organisation, Lund Institute of Science and Technology, the academic year 1987/88. The civil engineers were presented to the model characterised by Growth and were given the task to imagine that they lived in this

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environment and to describe this life by making a narrative or in some other significant way. The same task was given to theoretically working economists and professionals for a comparison. When competence was defined as the degree of consciousness of the conditions for survival in the competition of this society the following circumstances were shown by means of Perspective Text Analysis (B. Bierschenk, 1990a):

The most conscious are the civil engineers. Their conduct towards the cybernetic way of functioning as realised by the model society is clearly rational. Even though they do not entirely embrace the underlying value system of the model they are able to *adapt* and through their *competence* see what is required from them according to the circumstances. The deepest concept in their graph is *perspective shift*, which has been interpreted as a dynamical conduct (p. 21). Doctoral students in business administration behave more in accordance with what is implied by *persistence*, because they are not inclined to adapt or are unable to. The professionals on the contrary express an *ego-strength* and keep *alert* and *adaptable*.

The way competence was defined it is quite evident that the technologists' model sensitivity must be interpreted as social sensitivity, which implies that their education is well adapted to the reality that is waiting for them, if we presume that the Growth/Process model is characterising the Swedish society. The perceptive ability in these engineers and their context/environment meet at the same abstraction level, according to this study. Thus we need not speculate in personality, talent for or interest in the educational program, knowledge background, etc. Instead it is a matter of structural matches between context/environment and the single technologist, which he reproduces by his constructive text production.

Another point of departure is an experiment in the comprehension of concepts in Swedish gymnasium students, which was carried out in connection with literature studies during the spring term 1997 (I. Bierschenk, 1997, 1998b). The course had as its purpose to instruct a hundred students from various study programs in modernistic ideas. A special interest was paid to the so-called "isms" in literature and art (such as the futurism, the surrealism and the expressionism) and their relation to the scientific concepts behaviourism, structuralism and functionalism. The students were asked to investigate how these concepts or ideas have been transformed into models of society (on video) as well as into pure literature (in novels).

The three models differ in conceptual depth and thus they are unequally easy to transform into a society or into literature. In the course they were applied in such a way as to make the correspondence clear between the paradigms and the cultural and literary concepts (ideas) behind behaviourism, structuralism and functionalism. The program was terminated with a comprehension test. It consisted of 15 short texts (items), constructed so that each one was an indirect description of a modern literary/cultural concept in function. (A detailed account for the procedure is given in I. Bierschenk, 1997.)

The comprehension of ideas, in the study defined as competence, was proved to be equal among students in natural science, social science and aesthetics. But the concepts differ in depth from one another. This was a result of a differentiation between concepts in relation to their degree of difficulty in comprehension (structural depth), as shown in the students' responses, and *not* a differentiation between classes. The degree of depth could be established by binding the concepts to the three paradigms, for which the structure was already known. By this the theoretical anchorage of the test could empirically be decided, which is important to the proposed research program.

Without going into statistical matters, which have been presented elsewhere (I. Bierschenk, 1997, Table 4), it should be stressed that with this test a scale has been developed, which denotes four evolutionary steps or levels, which can be used to steer an instruction process or competence development program. The test on which the scale is based was developed during a long time and is founded on both studies of sources and experiments.

With these studies as a basis, it may be stated that text materials used for instruction and testing in educational contexts have to be extremely well selected or constructed to correspond to the structure of the desired level, if competence is the aim of the instruction process. The idea has been introduced under the name of direction of materials (see section 5.2). For this purpose there exists no measuring methodology so far.

4.2 From Macro to Micro Level

The studies and experiments reported which are related to the three social models and for which B. Bierschenk has developed a measuring instrument should be assigned to a macro level. The results, which have been extracted with this instrument, however carefully tested, are just indicative, that is, it may be more or less assumed that competence of some kind is to hand. Concepts, definitions, and other frames for interpretation are, moreover, decided outside the individual, who gives his responses to a given task.

For the same reason the analyses carried out with Perspective Text Analysis should also be assigned to the macro level, since the prerequisites at the problem setting were the same. For sure, the analyses are structural in the sense that the individual perspective can emerge through a text production but its origin is still an external cause. The pre-condition of the new research program is that analysis and synthesis starts out from a micro level, which implies internal frames of interpretation.

4. Toward a Theory of Materials Construction in the Humanities and Social Sciences

The starting point for an investigation of the structure of a material is the cultural and scientific concepts, which could be experimentally bound to the three scientific paradigms mentioned and be grouped according to degree of difficulty (I. Bierschenk, 1997). It turned out that the scientific concepts, for example behaviour modification, cybernetics, and Gestalt, have properties, which are unequally difficult to apprehend and realise when they are put into function in a story. The results of the experiment thus give evidence for the assumption that the models are unequally difficult in depth. Swedish gymnasium students could most easily apprehend the Behaviour model and associate it with a good society, which gives Eigenvalue to its citizens. Against the background of the negative view on mankind put forward by this model, it is natural to ask what the students actually have understood (I. Bierschenk, 1998a).

The reasoning in these studies is based on the assumption that competence is connected with civil comprehension, for which the reading of literature will be a bridge. The version used of model societies was a picture series, put onto VCR records together with sound. In what way pictures differ from text will not be discussed here. But it is evident that even if the text in the literary test mentioned which described the idea of behaviourism was easiest to give a correct answer to, it is not clear why. Against the background that Skinner, the author of the theory, has formulated the basis to the text, a given task would be to analyse this text to investigate into how it is constructed to give the answers it gave. That a text material in fact can be constructed so as to carry underlying theoretical information has been demonstrated in Elstrup Rasmussen (1997b, 1998).

Other items in the test have been produced under different conditions than the Skinner text. In some cases they were constructed after careful research. In other cases the texts have been extracted from textbooks. In all cases the text in question is natural, and should carry a theory. The question is which structure has been established in the text.

An important pre-condition for further analysis is that structure cannot be put onto the text a priori, it can only be discovered, for which we now have a method. With this method it will be possible to look into somebody's knowing and get answers to questions like: What did

the theorist know, which we want the students to know? How is this knowing composed into informational invariants? And similarly: Have the students in their textual production been able to formulate the desirable knowing? Instead of differentiating students by their qualities, qualities in a material should be determined. In short – the purpose of continued research is to analyse the prerequisites of competence development on the basis of a material. A theory of materials construction for the humanities and social sciences would be a possible and desirable development with self-evident generalisation to other subject areas as a consequence.

As has already been discussed, no method has existed, which has the capacity to make visible the internal factors governing and controlling a learning process or which can present what knowing consists of. With the proposed theory of material construction as basis it would be possible to manifest the effects of a learning process, that is, what someone knows. Knowing (or knowability, B. Bierschenk, 1984) is a phenomenon, which emerges through text building but has nothing to do with grammar (I. Bierschenk, 1984). The knowing is expressed in the teacher, the student, and the materials but at different structural depth and with different rotations when the process goes on. The text is central, spoken or written, and in this process it also constitutes the context for structuring of information. Thus the text is the learning environment of the micro level.

Below some studies will be presented, which may serve as starting point to research on text materials with competence development purposes.

5.1 The Knowing of a Behaviourist

The first study of the theoretically defined text material concerned the fundamental idea of behaviourism the way it could have been applied by Skinner himself, for example in Walden Two. The question was, quite naturally, whether the theory, which is well-known, is reflected in the text, so that it could function as a reliable test item (about 50 words), measuring what it was intended to measure. I. Bierschenk (1999c,d) gives an analysis of the conceptual relations of the text and also the dimensionality expressed by the topological form of representation. The concepts denoting the dimension are given in parentheses.

The study points at four very typical dimensions, one denoting machine-related terms (*effectiveness*, *technology*), one taking up the method aspect (*working order*), one representing design (*shaping*, *trimming*) and finally one standing for a rise in quality (*refinement*, *representativeness*). Thus Perspective Text Analysis had picked up the structure implied in behaviourism.

The result is discussed in relation to a suitable application in teaching. Since the point of departure for the test had been the comprehension of cultural and scientific concepts transformed into literature, three literary examples are given of how materials could be selected depending on degree of difficulty, that is depth. Certain conceptual relations are matching certain novels. I discussed George Orwell's "1984", Alexander Solsjenitsyn's "Odin den Ivana Denisovitja (A Day in Ivan Denisovitj's Life)" and Karin Boye's "Kallocain". The three novels are examples of the way the concept 'refinement' is deepened. In Orwell's novel it can be studied in its social context, where the model is stronger than the individual. The contrast is given in Solsjenitsyn, where focus is on self-refinement through inner exile, making the individual stronger than the model. Boye gives a perspective from inside about what happens within and between individuals when the system is demoralising life.

In this study it is shown that structural control from the part of the teacher would steer the selection of materials. As a consequence, the teacher is spared from the heavy task to decide on the amount of text and the student would get a clear information on what is required of him at a certain level. But this requires that level will be connected to a grading system.

5.2 The Hidden Competence

The concept of structuralism belongs to the deepest of the tested ideas and is therefore very difficult to encompass to a gymnasium student. To read Kafka is a venture, for example, since the discussion easily lands in the surface bound, organisational aspects of society and human conditions, an evidence that structure only with difficulty can be mastered by students of gymnasium age. A cultural expression of structuralism is the expressionism, which among other things comprises chaos, anxiety, and conflict in a mental sense. Another expression is the psychological concept of Gestalt, which is more holistic as a theory of human development and almost the opposite of behaviourism. At this cutting edge lies the concept of 'war', which, when applied, functions as a destructive force within the Gestalt. Much of this is reflected in the modern war novel (e. g. Remarque, Linna, and Trumbo). To test the understanding of such a text at a deeper level may thus be a task to give for a diagnosis without having to consider the deepest dimensions of structuralism.

One study (I. Bierschenk, 2000b) presents an attempt to start a process in a number of concepts from a structure, taken from a text (about 25 words) by Machiavelli. The structure was used as criterion for a writing task in the gymnasium school. Here a process is simulated, in which the teacher gives the students the task to explain the war novel they just read by using the words *parrying*, *challenge*, and *risk*. With the help of these words they write a short text, which the teacher analyses by means of Perspective Text Analysis and then compares against his own key. If the two structures match, then the students have passed the criterion and consequently the test. The deepest concept should circle around *mastery*.

One student is selected for control. The student has not qualified so far, which means that he has received the grade IG (not passed) on the preceding course. The test correction now shows that this student did well on the diagnosis. His concepts of *solution*, *resistance*, and *preparedness* lead to the deepest concept *capability*. It gives the teacher the answer: This student understands the deep dimensions of the novel. Even though he is not qualified, he is competent. The competence is hidden in the text he produced and was disclosed by the method of analysis.

The result leads to a discussion of judgements of qualifications and competence respectively and the consequences for a modern educational system (compare McClelland, 1973). The report states that this is a step to take, if one wants to underpin the idea that the Swedish school has as its aim to centre round the single student's ability and responsibility. The method is well adapted to point at the unique quality in every individual person and not in classes.

5.3 The Natural Scientist and the Question of Education

There is an academic discussion going on about the education of minds (Kjørup, 1999). The question of the role of the humanities was taken into consideration (I. Bierschenk, 2000a) against the background that many debaters argue in favour of the educating role of the humanities in the development of a society and its citizens. Within natural science there is an awareness that humanistic values are important building blocks to reach a comprehensive knowledge of the world (Sjøberg, 1999). Therefore, drastic measures are taken to lure female students to attend the technological programs, so that the male students may gain from those female aspects of life that they are lacking.

As part of a course in literature in the gymnasium school, the question of natural science education was connected with the question of moral development by the study of novels with a technical-futuristic theme. The futurism was a cultural ism in the beginning of the 20th century, which supported progress in every form. In this study, the futurism was

redefined to mean a social dimension and in this way it was possible to assume that the futurist novel as a genre would be educating to the extent that the author succeeded in mediating the intrinsic moral value of a society.

The basis for the study of the concepts of futurism was a test item (45 words), just describing social development in the light of modern genetics and its results. In connection with this part of the course a number of novels with a critical outlook were studied, among others "Brave New World" by Aldous Huxley, "En levande själ (A Living Soul)" by P C Jersild and "The Hand Maid's Tale" by Margaret Atwood. The test item was analysed with Perspective Text Analysis and was found to contain among other things a dimension denoting a social climate, whose concepts *public morality* was closest to the research problem formulated. With the help of this one and two more words the students of two classes got the task to give their explanations of the novels.

Is the natural scientist capable of contributing to education by representing public morality? The topological analysis showed that the deeper embedded concepts, which constitute the basis of a moral concept, are only present in Huxley, who was also a natural scientist. This means that "Brave New World" is the one, which has had an effect on the understanding of a civilisation ideology. In P C Jersild, trained physician, there are more of personal attitudes of political kind manifested. Is there an educational effect, it is unclear. Atwood, who represents the humanities in this selection, puts forward in her vision of a future society the horror methods, which makes her novel unreliable in relation to morality, seen as scientifically based education. Reading pure literature gives both cultural and general education, is an opinion among the responsible administrators. Which are the governing principles for selection?

5.4 The Measurement of an Idea in Function

A research question, which could be answered with Perspective Text Analysis, is whether the structure of a material corresponds to the conventional view. If the teacher describes and explains texts from out of routine study of the subject theory and this is proved to be misleading, this should have consequences both for the students' learning but also for the way they are examined. One example is the common picture of Ernest Hemingway's writing style. In being a modernist he is assumed to have acquired some modern scientific concept or cultural idea and transformed it into literary form. The concept associated with him is the behaviourism.

The 1920's in America were permeated by functionalistic ideas, whose expression at the experimental level was manifested as behaviourism. Thus it was assumed (I. Bierschenk, 2001) in an experiment on a Hemingway text that the writer is functionalist in mind (the ideational level) but behaviourist in practise, that is, at the textual level. This means that the experiment was intended to separate the two levels, just as it may be done in the "Visual cliff" experiment: The design is functionalistic and the events on the glass top can be described in behaviouristic terms.

By an analysis of a portion of the dialogue of about 20 lines in "The Killers" of 1927 (Hemingway, 1977) and a representation of the space of the text it could be shown that the text is very "flat", that is, it does not extend under the sea line. Moreover, the orienting space of the text was separated from the intentional space, which resulted in two spaces with very similar shape. It is natural however, that intention and orientation in a text act complementary to each other in an asymmetric way. Thus the writer has consciously designed the textual surface so that it would be as symmetrical as possible, to avoid that any depth or implicitness will be the result from reading. The analysis shows that the method functions precisely.

A further analysis (by means of radians) informed that the conceptual relations quite evidently are related to a functionalistic-behaviouristic sphere of ideas. *Pain*, built up by *exposure* and *threat* are the most concentrated concepts at the orientational level, corresponding to what the infants perceive at the virtual cliff. This level could be separated from the intentional (ideational) level, where *pain* returns but now is built up by *threat* and *firmness*. The experimental designer is clearly emerging on the ideational level. Evidently, Hemingway with functionalistic firmness has modelled his literary figures' exposure at Henry's bar.

When this analysis was performed the method had been developed to take care of the angled articulation typical of a perspective (B. Bierschenk, 2000; I. Bierschenk, 2000c). This development was well suited for testing the hypothesis, that Hemingway is a functionalist and not a behaviourist. The analysis further showed that the functionalistic ideas are permeating both the structure as well as the spatial development of the text. A function is something purely abstract and the articulation forms a right angle, which in strict mathematical terms is meaningless. But despite that the text is just a skeleton, just like the result for the fisherman Santiago in "The old man and the sea", there is a structure, which the analysis method has revealed. It is quite natural that this structure denotes the core of functionalism. A result over and above this is that the so-called iceberg technique, which is a common description of Hemingway's style, cannot be confirmed. There is no iceberg, if one means that the larger portion of the textual meaning is to be found under the surface. It may be that it is the reader's projection that produces the hidden meaning, if there is any.

A second experiment was made on the test item, which was intended to describe the concept of functionalism in the form of a short situation in the earlier mentioned comprehension study (I. Bierschenk, 1997). It had been difficult for the students to separate this item from the one describing the behaviourism. It turned out that the intended idea really is described as well as possible, since both a behaviour component and the functional (ideational) component were possible to distinguish from one another. The behaviour level generated concepts, which were concentrated in *purity* whereas the ideational level turned out to consist of design related concepts, which concentrated into *transparency*.

The conclusion is that the two texts, despite their being different in purpose and genre and having been constructed with an interval of seventy years, carry an invariant structure of the idea of functionalism. The experiment further shows that the constructor of a material always will have his input into the structure, whether he is aware of it or not. As to text materials this could not until now be demonstrated when by means of Perspective Text Analysis we have been able to separate intention from orientation.

6. References

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Accepted March 20, 2001

Author's Note

The preparation of this research summary has been financed by The Ruben Rausing Foundation for Enterprising and Innovation, Sweden.

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